

AperTO - Archivio Istituzionale Open Access dell'Università di Torino

Choices, and Satisfaction in a Bargaining Game

This is a pre print version of the following article:

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1719082> since 2019-12-13T12:37:50Z

Terms of use:

Open Access

Anyone can freely access the full text of works made available as "Open Access". Works made available under a Creative Commons license can be used according to the terms and conditions of said license. Use of all other works requires consent of the right holder (author or publisher) if not exempted from copyright protection by the applicable law.

(Article begins on next page)

Preferences, Choices, and Satisfaction in a Bargaining Game¹

by

Angela Ambrosino (Dipartimento di Economia - Università di Torino)

Alessandro Lanteri (Erasmus Institute for Philosophy and Economics – Erasmus University Rotterdam)

and

Marco Novarese (Center for Cognitive Economics - Università del Piemonte Orientale)

*Working Paper
Center for Cognitive Economics
Corso Borsalino 44, Alessandria (Italy)*

Word count: approx. 7,500

Keywords: bargaining, cheap-talk, expectations, preferences, satisfaction

JEL Classification: C78, C90, D02

October 2005

¹ Earlier versions of this paper were presented at the 7ème Journées d'Economie Expérimentale at CREM Université de Rennes I (8th June 2005), at the 3rd Debating PhD Conference in Economics at Real Collegio Carlo Alberto in Moncalieri (10th September 2005) and at the Esa 200 European conference in Alessandria (17th September 2005). We are grateful to our discussants Giorgio Coricelli, Brice Magdalou, Davide Dragone, and Salvatore Rizzello as well as to the many participants for their helpful comments. The usual disclaimer applies.

Introduction

When they are bothered by the naïveté of their conversant, it is common to hear people in Rome cynically remark: “nowadays everything has a market price. And chitchat’s is zero.” What they mean, although the sentence makes it sound rather fancier and less rude, is that opinions are worthless. And listening to them (or uttering them, for that matter) is a waste of time. Being known as worthless, they have no practical consequence.

Most economists think along similar lines, and tend to dismiss ‘cheap talk’ – by which we mean the exchange of costless, nonbinding, and non verifiable information – as unimportant or irrelevant. Since words do not create enforceable commitments, economic agents have no incentive to divert from purely opportunistic behaviour regardless of what they said or heard, thereby wiping out any effect of cheap talk. Indeed, “it is always consistent with rationality to treat cheap talk as meaningless” (Farell and Rabin 1996: 108). To be sure, it can be shown that talk has effects on coordination when it is not conveying commitment, but disclosure. In other words, cheap talk leads to equilibrium (and should be trusted by players) when a player expresses a preference for her dominant strategy (ibid.: 104-5). Alternatively, in games with a conflict of interests, cheap talk helps coordination when both players have a strong incentive to achieve coordination (ibid.).

In these theoretical market situations economic agents relate not to other human beings, but to rather aseptic transacting partners. They do not share anything but a quick exchange over a price both deem satisfactory or attempt to achieve an individually beneficial coordination. Under these conditions, prisoners defect, competitors push the margins down, and salesmen have a hard time selling second hand cars to potential buyers. Good and bad outcomes realize, as economic theorists can show. When we buy a steak for dinner at the supermarket down the street or adjudicate a rare stamp for our collection at an auction, when we order home delivery pizza by phone, purchase from a mail catalogue, or reserve a plane ticket online, we are using the market mechanism, undergoing a transaction with someone who couldn’t be less interested in our empty words. As Deirdre McCloskey is fond of repeating, however, we do not treat a store clerk like a vending machine. Exchanges are psychologically, emotionally, and socially embedded. Many real-life transactions involve face-to-face contact, greetings, etiquette, bargaining, discussions, detours into casual chats about the weather, repeated encounters, etc... they establish a sort of more profound relationship between what would otherwise be just transacting strangers (e.g. McCloskey 1996). All of this, *ça va sans dire*, has major economic consequences. It could, for one instance, increase perceived proximity among subjects and facilitate the emergence of ‘sympathy’ (e.g. Sally 2002), which solves commitment problems in asymmetric information trades or in non-cooperative game theoretical settings (e.g. Frank et al. 1993). These remarks might suggest that talk is not that cheap, after all. Although costless, nonbinding, and non verifiable, informal talk can improve the efficiency of game theoretical negotiations under many (although not every) conditions.

A cheap talk session, as it can create a kind of common knowledge, could be one of the major factors influencing individual expectations, aspirations, and behaviour in a bargaining setting.

The present work is part of a wider research project aimed at investigating different related aspects on individual and social functioning. In particular, one of the most relevant aspects under inquiry is the effect on a bargaining game of a preliminary cheap-talk session. In the bargaining game experiment we shall present shortly a general discussion is conducted, followed by a poll in which players must find a common solution to an abstract bargaining problem. This preliminary session has two possible effects: either the discussion generates a socialization effect or the vote creates a focal point, a shared expectation on the solution to reach in the next bargaining. The socialization effect can be expected to reinforce or replace focal points in making the bargaining easier. It should, in fact, bring about a sort of reciprocal attraction, or it should give place to the recognition of the others. In any case, the socialization effect is always capable of generating common knowledge about game conditions. From this point of view, therefore, this paper

contributes to a wider research project aimed at studying the evolution of institutions in relation to individual learning (seen from a cognitive perspective as any change in behaviour related to previous experience).

As already pointed out in the seminal works of Siegel and Fouraker (1960, 1962), bargaining behaviour can be better understood by taking into account individual expectations and levels of aspiration about the possible outcomes. Such levels are affected by many factors. This adds to the difficulty of empirical study of expectations. Among other aspects, it is certainly important to distinguish solutions that are more fair, reasonable or straightforward.

In our experiment players choose among multiple equilibria that we designed so to impose a trade-off between efficiency and inequality. The presence of institutions capable of improving cooperation and of allowing easier bargaining, by means of reducing transaction costs, can be an important resource for an economic system. It is therefore important to understand how and when do they emerge, evolve and eventually stabilize or disappear.

As it is an essential but preliminary step of a wider research, this work suffers from some limitations. The more relevant are due to the dimension of our experimental sample and to some aspects of the experimental design. It is, as a general methodological point, preferable to manipulate one experimental condition at a time, in order to pursue quasi *ceteris paribus* conditions. In this experiment the cheap-talk session and the poll might both be considered as different conditions with respect to the benchmark of a bargaining game in the standard form. Nevertheless, within the broader perspective of the whole research project, asking our subjects to express a vote about their preferred outcome for the distribution of a payoff without a preliminary discussion did not make sense. We believe it is not through abstract opinion polls that we can address the questions such as whether it is possible to devise institutions in an experimental set that promote coordination of behaviour among participants with conflicting interests. It is therefore better to be generous in establishing conditions at this stage and scale them down in a following stage aimed at testing more pointed hypotheses.

A second major concern of our analysis is the link between preferences, choices, and satisfaction. These three aspects are strongly related to the above argument. We expect institutions to give rise to socially shared preferences and to determine, as a consequence, standardized choices.

Economic literature has not yet achieved a satisfying and agreed upon solution on this topic. Moreover, at an empirical and experimental level, we face also the problem of measuring satisfaction and preferences. In standard economics these two variables are measurable only through agents' actions. Preferences are revealed by choices and, by definition, they are utility maximising ones. This idea, however, is meaningless outside the hypotheses of perfect knowledge and rational behavior. In the real world, even in an experimental context, people have to accept non optimal choices or opt for unfair solutions; in both cases this affects their welfare. Recent researches in Happiness Economics have pointed out how happiness is strongly linked to many aspects beyond economic outcomes. This new research field also shows the methodological success of measuring satisfaction by simply asking subjects to express it on a numeric scale.

The analysis of satisfaction is also typically neglected within experimental economics. In a previous study, yet, we succeeded in measuring it (by asking directly to the subjects to state it, as used in psychological experiment and in the analysis of individual happiness) and find a significant relation with subjects' behaviour (e.g. Novarese and Rizzello 2005; Novarese 2006). The results found were globally coherent with a Simonian model of procedural rationality. We now also try to go further in this kind of analysis. Referring to preferences, we mean a normative theoretical answer to the question: "which solution should the players of this bargaining game reach?" Our subjects answered before even knowing that they were to play the very same game.²

² This implies that, at the time they provide an answer, subjects ignore which of two possible roles they will have in the game.

Some Methodological Considerations

Why study satisfaction and preferences?

As pointed out by a large body of literature (see among others Happiness Economics, Simon's pioneering works, Schelling's contributions and a vast amount of experiments), expectations and beliefs influence decisions. Individuals do not think only in narrow self-interestedly terms and do not aim for material goals alone. Are these concerns measurable? And does such measurement make any good sense?

Our best attempt at answering these questions is by showing empirical regularities and other evidence that may support (or falsify) the existing models: a warning is due, however, because the models present in the literature are still rather general and not clearly specified. Also, to elaborate on the issues raised above, it is useful to collect all the meaningful variables in a coherent framework, taking into account that even very intuitive results can be important to assess whether some variables affect the final results.

Why a bargaining game?

As explained above, the main purpose of this paper is to clarify whether, and how, social interaction generates focal points. More than 40 years ago Schelling already pointed out that empirical analysis is necessary in order to investigate the coordination behaviour of individuals with non-aligned interests, as the ones described in non-zero sum games.

His experiments in the 50s show that individuals can often coordinate their behaviour by just focussing on a few selected aspects of the environment in which they operate, aspects that are often abstracted from and disregarded in traditional theoretical models. Moreover, successive research has shown that the convergence of decisors' behaviour towards given equilibria depends on many characteristics of the environment which are ignored in theoretical models. Finally, Schelling' research on coordination games (1958, 1959, 1960) prove that some factors explicitly neglected by the theoretical literature are indeed crucial.

A critical difficulty in pursuing this stream of research is that it is often impossible to characterize *a priori* the focal point towards which individuals coordinate their choices, just by inferring what a perfectly rational player (or a group of them) would do. This class of coordination games with multiple equilibria require some kind of "social rationality" (Arrow 1986). An equilibrium becomes a focal point not because of the conduct of a single individual, but because it is considered as such by the whole set of players. When an equilibrium is focal, then each player expects every other player to behave consistently with that solution, she will thus choose her own behaviour in the lights of this expectation.

The starting point to understand why a certain solution of a game becomes a focal point remains nonetheless the analysis of individual behavior (Schelling, 1960). It is therefore impossible to predict how decisors will coordinate on a given equilibrium unless we collect enough empirical evidence on the choices made by individuals who face in reality problems of the same kind.

Schelling himself, using coordination games, started this field of experimental research centered on the study of focal points. Unfortunately, one of the biggest problems in doing experiments is intertwined to a weakness of economic theory. The theory known up to now does not allow us to predict how a group of people will behave in a specific situation. Usually researchers assume that at equilibrium the agents have rational expectations: this indeed gives a shortcut that avoids the necessity to build a more consistent model of expectations formation (Kagel e Roth, 1995). We believe that not only strategical considerations are important when one tries to characterize a focal point in a coordination game. Individual behaviour, as well as the interpretation of the behavior of other players, matter, and these are influenced by sociological and cultural aspects.

We choose to set up a bargaining game experiment, basically to account for all these aspects.

Hey (1991) distinguishes between a bargaining game from a normal game because the former includes some additional elements which are not present in a generic game featuring a non-cooperative interaction between two or more players or groups of players. Indeed, in a bargaining situation, there is often a pre-bargaining period during which some implicit or explicit agreement can arise. For our purposes bargaining games are the most suitable methodology to see which elements drive the players towards some focal solutions which do not reflect simple strategic considerations: resource sharing is not only the result of objective conditions (each player's marginal contribution) but also of the bargaining strength, of the rules, hence of institutions.

Why experiments?

In the vast field of contemporary economics, experiments are a flourishing methodology that proved helpful to address a wide range of questions, from microeconomic problems to public economics, from environmental economics to organizational theory. Moreover, it is very often linked to game theory, another successful branch of nowadays economics. In its most recent developments experimental economics also employs tools derived from artificial intelligence, cognitive psychology, and neurobiology, and simulations derived from neural networks theory.

Although experimental economics seems to be, from a methodological and epistemological point of view, a rather heterogeneous product, from our perspective it has an important advantage: it allows the investigation of empirical regularities concerning hypotheses that would be very difficult to study otherwise. Experimental economics represents a crucial tool when one wants to build models that capture the complexity of modern economic systems.

The experiment

The experiment was conducted in November 2005 with 28 students attending the preliminary course in Economics at the Faculty of Law of the Università del Piemonte Orientale, in Alessandria (Italy). They had to bargain, anonymously and within randomly generated couples, over the distribution of bonus points to be added to their exam's grades. Three possible results were allowed:

- a) 0.5 for each of them;
- b) 1 for the student who got the lower grade (among the two) during a mid-term exam (player A), and 1.5 for the other (player B);
- c) 1.5 for player A and 1 for player B.

Solution (a) represents a fair division. We chose such a penalizing fair solution because in the lights of previous experiments it appears that a less penalizing solution (e.g. 1,1) is too obvious to every player. In order to obtain a higher additional score (on a 30 points scale), subjects had to accept inequality, and decide who obtained the higher reward (the "poorer" between the two vs. the one who studied more).

Before being informed of the instructions of the bargaining game, players received a written presentation of the situation just described and had to propose a solution (see [appendix](#)). Two weeks earlier they took a mid-term test. This creates an easy identification with the situation proposed. Half of the students (treatment G), after giving their personal preference (PREF1), were asked to discuss in group the problem and to vote for one of the alternatives (PREF2³). It should be noted that 'preference' refers to the generic solution only. When a player knows her role, her preference can be expected to be the one granting the highest score (although this is not always the case). Between the first and the second choice, in treatment G, 5 persons changed their choice, and expressed the preference for solution c ([table 1](#)).

At this point they were required to say if in a situation like the one described, they expected to be A or B (EXP). We already see ([table 2](#)) that subjects in G forecast more closely their actual role. This might be due to the fact that they revealed their real grades during the cheap talk session and could therefore form informed expectations about their ranking. Even in treatment G, however, two students wrongly predict their role. This might be because certain subjects lied,

³ For treatment S, PREF2 is equal to PREF1.

although this appears highly unlikely.⁴ Also, it may be that the random pairing of the students is responsible for this effect: after all, the student with the second highest grade could still be A, if coupled with the student with the highest grade, and the student with the second lowest grade could be B, if coupled with the student with the lowest grade.

Table 1. Preferences (PREF1 and PREF2) by treatment

	Treatment S	Treatment G	treatment G
	PREF1= PREF2	PREF1	PREF2
A	2	4	2
B	6	6	3
C	6	4	9

Table 2. Expectations (EXP) by treatment

	real kind of player					
	A			B		
forecasted kind of player	G	S	G+S	G	S	G+S
A	6	3	9	1	2	3
B	1	4	5	6	5	11

After being coupled, anonymously and at random, players received the written instructions and were informed if they were the player A or B depending on their result in the mid term test. Then the bargaining started. At the end of this phase, after having reached an agreement (AGR) players were required to express their satisfaction for the results (with a number from 0 to 10) and fill in a questionnaire.

Hypothesis

The effect of cheap talk in experiments has still to be conclusively tested, especially in games of bargaining that allow a kind of communication between players and in certain respects reduce the need to have a common vision to achieve a solution. Moreover, in the present experiment we do not have a simple "cheap talk", but a discussion followed by a final poll. In this case we have to take into consideration that the decision reached by a couple of players may be considered binding independently from individual preferences. This could affect the final satisfaction of the players. It is, however, not granted that the voted solution constitutes a focal point and that solution needs not be accepted by everybody. In this case the individual preferences expressed at the beginning of the experiment (PREF1) should bear larger influence on behaviour (and this should be especially true for players in the S treatment). Players should then try to obtain their preferred individual solution, more or less independently from the solution pointed out by the group.

On the other hand, even to the extent that both individual and group preferences matter, the two players facing each other can still have different opinions. There is then another element to analyze. If players find a focal point, that particular solution becomes the reference point to construct individual expectations. If a focal point is instead not found, individual preferences do not necessarily coincide with expectations. For example, each player can judge solution a fair, and try to reach it, but he is not sure that this solution is also accepted by the other players. Yet, as shown by Siegel and Fouraker (1960, 1962), even in this situations expectations play an important role in determining individual behaviour and the efficiency of interaction. Therefore this experiment allows the evaluation of the effect of cheap talk on expectations, behaviour, and satisfaction.

This assumption is largely plausible and indeed 6 out of 7 proposals in treatment G and 5 out of 7 in treatment S are coherent with the vote expressed by individual proposers (table 3).

⁴ One might object that, in order to convince the rest of the subjects that they were in favour of a given alternative as a matter of principle regardless (and actually against) of their self-interest, certain students would lie. Subsequently, if deception was successful, they could exploit the situation. This is implausible in the light of the fact that the students at this stage didn't know yet that they would have to agree on such a division for real.

This represents *prima facie* evidence that the preferences expressed bind players' conduct. Such constraint might be explained by a perceived obligation to behave consistently with stated preferences. It is true, on the other hand, that the original situation was described as a generic thought experiment, while subjects can now freely determine their behaviour in the specific situation at hand. (See also our remark on preferences above).

Table 3. First offer by B players by treatment

	Treatment G	Treatment S
A	1	0
B	3	5
C	3	2

Results

A first look at the results points to the discouraging realisation that there are no detectable or statistically significant differences in the outcome of the bargaining of the pairs of subjects in the two groups: all the 14 couples reach an agreement as shown in [table 4](#). We might have to admit that talk really is cheap.

Should we conclude then that the discussion did not affect the negotiations? Indeed, if it seems that the solution voted by the group is not a true focal point that can drive the behaviour of every player, this could be due to the fact that the solution has been chosen by a majority of 9 against 5 (and not unanimously). If we consider the result of the poll, and then we look at the final results of the bargaining, we observe that 4 of the 7 couples reached a bargaining agreement in line with the solution voted. This result suggests that the outcome of the poll might have been considered binding at least by those who voted for solution c. Moreover, we have to take into account that for each case we can study a small number of couples: the results we obtain from this experiment must be verified by a new experiment involving a greater number of players (which could potentially also give more clear predictions).

Table 4. Final agreement (AGR) by treatment

	Treatment G	Treatment S
A	0	1
B	3	2
C	4	4

We know from the long history of economics that individual satisfaction depends on the actual outcome of a transaction and since on other occasions such measurement succeeded (Novarese and Rizzello 2005; Novarese 2006), we asked students to grade their satisfaction about the outcome of their game, which we report individually ([table 5](#)) and by couple ([table 6](#)).

Table 5 Distribution of individual satisfaction by treatment

	treatment S	treatment G
6	3	
7	2	
8	2	5
9	1	1
10	6	8

We can note that there are some differences in the distribution of the satisfaction between the G and the S treatment. The distribution of G is settled on higher values, while the distribution of S is characterised by a higher variance.

Table 6 Distribution of average satisfaction of couples by treatment

	Treatment S	Treatment G
6.5	1	0
8	3	0
8.5	1	1
9	0	4
9.5	1	0
10.00	1	2

Discussion

Although the apparent irrelevance of the cheap talk session puts a challenge on our attempt, the tension can be dispelled. The traditional economic model explaining satisfaction as a function of payoff, indeed, is too simplistic.

The agreement reached by each couple is obviously the effect of the preferences of both partners of the bargaining. As suggested above, the preferences after the game starts (call them PREF3) can generally be expected to correspond to the outcome-maximising solution. A and B thus have a conflict of interests. Both, however, have a clear incentive to reach an agreement within one hour, after which they both get nothing.⁵ If they cannot find an agreement and settle with a solution, they achieve a sub-optimal equilibrium as both players could be made better off without damaging any of them. All of this is *mutual knowledge* – i.e. every player knows the payoff structure and can infer (with imperfect confidence) the PREF3 of her (unknown) partner – it is also *common knowledge* because they know that each player has access to such information. In treatment S, each player's PREF2 is private. In treatment G, on the contrary, the collectively identified PREF2, including the reasons why each player prefers different solutions, is public; even if PREF2 is expressed without knowing whether each subject will play the game as A or B.

According to standard economic theory, public information elicited by a cheap talk session bears no effect on the anonymous bargain that follows. We disagree.

There is, indeed, a curious difference among the findings of the two treatments that overcomes the problems identified above. The first column in [table 7](#) reports the combinations of preferences stated by each pair of subjects. The preference of player B (remind: the one with the higher grade) is indicated first. The following columns indicate for each pair the actual agreement reached. For example: There are two couples (one in treatment G, one in S) where player B prefers solution a and player A prefers solution b. The actual solution is b in treatment G and c in treatment S.

Table 7 Preferences of partners and actual solution for the pair

B's PREF2 - A's PREF2	Treatment G		Treatment S			Total
	B	C	a	B	c	
a-b	1				<1>	2
b-a					<1>	1
b-b				1		1
b-c	2		<1>		1	4
c-a		1				1
c-c		3		<1>	1	5
Total	3	4	1	2	4	14

Our subjects endorsed different opinions about which solution should emerge. If the opinions of the partners are dissimilar, at least one of them should change it or no solution is to be found. In case of disagreement there is also the option to shift to the third solution (the one disliked by

⁵ There is a limit of 10 proposals from each side. This information was implicit. Players only know that they have one hour of time and that each offer had to be expressed every 3 minutes.

both). Table 7 shows that this solution is the most probable in treatment S while it is never reached in treatment G.

In treatment G there are 7 cases (out of 7) in which at least one player gets the preferred solution. For treatment S, there are only 3 cases out of 7, that is in 4 cases out of 7 (between brackets in the table) nobody gets the preferred solution. This difference is statically significant according to the chi-squared test (p value=0.018).

Model

The reported differences in satisfaction and the differing degrees of consistency between outcomes and preferences/expectations, might support the conclusion that satisfaction also depends on the latter. Table 6 reports some estimates MQO (OLS) of the following model:

$$\text{SAT (i)} = a + b * \text{score} + c * \text{Rpref2} \quad (1)$$

Where Rpref2 = 1 if AGR = PREF2, 0 otherwise.

The estimates are either realised on the pooled observations (with a dummy variable = 1 for players in G) or separately for each treatment. The estimate in column all5 also uses the following variables:

score_ts = score for players in treatment S, 0 otherwise

score_tG = score for players in treatment G, 0 otherwise

and it is used to test whether the impact of score on satisfaction is different for the two treatments. Understandably (also following from results in Novarese and Rizzello 2004) the main effect on satisfaction is determined by score. These estimates are thus employed to check if obtaining the preferred solution also influences individual satisfaction. The impact of score is significant and identical for both treatments.

We now turn to the estimates of each observation. As shown in table 8, the fit of our model increases by introducing Rpref2. This variable is very significant in all2. It becomes less and less significant in all4 and all5, when it interacts with group dummies, because of collinearity problems. (Rpref2 is almost always 0 when dum_grup=0 and it is 1 when dum_grup=1). The same result about the great significance of Rpref2 obtains considering only treatment S.

Table 8. Estimations with the individual satisfaction as the dependent variable

	all1	all2	all3	All4	All5	treat S-1	treat S-2	Treat S-3	treat G-1	treat G-2	treat G-3
A	5.1 (0.00)	5.1 (0.00)	5.0 (0.00)	5.0 (0.00)	5.1 (0.00)	4.8 (0.01)	4.5 (0.00)	7.6 (0.00)	7 (0.00)	6.7 (0.00)	9.5 (0.00)
b (score)	1.5 (0.00)	1.4 (0.00)	1.5 (0.00)	1.4 (0.00)		1.3 (0.00)	1.7 (0.00)		1 (0.06)	1.0 (0.05)	
c (Rpref2)		0.8 (0.06)		0.6 (0.14)	0.7 (0.11)	1.6 (0.02)		2.2 (0.01)	-0.4 (0.46)		-0.4 (0.51)
Score_TS					1.3 (0.00)						
Score TG					1.4 (0.00)						
Dum_grup (=1 for treat. G)			0.5 (0.18)	0.3 (0.43)							
P value F test	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.12	0.05	0.51
R ²	0.45	0.53	0.49	0.54	0.53	0.72	0.53	0.43	0.32	0.28	0.04
Adjusted R ²	0.44	0.49	0.45	0.48							

"-" indicates a variable not included in the estimation; the value in parenthesis under the parameter estimates is the p-value of the t-test

Since the payoff of paired subjects is connected, the observations for each player in a couple is not independent. Introducing the score in the estimate, however, lets us remove dependence. The connection between players, indeed, depends exclusively on this variable, as one player has a higher score, thus a higher satisfaction, and vice versa.

The average satisfaction of the 4 couples who obtained a different result from that preferred by both players is 7.6 on a 10 points scale, compared with 9.25 for the others (variance analysis: p-value=0.001; wilcoxon test p-value 0.002). For one of the four couples, however, this effect is biased by the fact that the final result is a, therefore each player also has a relatively low score, which explains in part a lower satisfaction.

It is therefore important to check the effect of score on satisfaction. We do so in [table 9](#), which reports a regression similar to that of [table 8](#), but this time we use the average values of satisfaction and score of each couple. The average value of score of every couple is identical, except for the two players who agree on solution a. The average score accounts for this effect. The new model therefore is:

$$\text{SAT} \left(\frac{iB + iA}{2} \right) = a + b * \text{mean score} + c \text{ COHER} \quad (2)$$

The variable COHER equals 0 if none of the two players achieves his preferred result, 1 if one achieves it and 2 if both players achieve it.

Table 9 Estimations with the mean satisfaction of each pair as the dependent variable

	All1	all2	all3	all4	G1	S1	S2
A	4.9 (0.00)	5.3 (0.00)	5.1 (0.00)	5.5 (0.00)	0.3 (0.00)	5.1 (0.00)	5.5 (0.00)
b (mean score)	1.6 (0.01)	1.1 (0.02)	1.4 (0.02)	1 (0.04)	-	1.44 (0.07)	0.97 (0.01)
c (coher)		0.7 (0.00)		1.3 (0.02)	-0.08 (0.87)		0.86 (0.00)
dum_grup (=1 for treat. G)			0.55 (0.20)	-0.11 (0.76)			
P value F test	0.008	0.001	0.02	0.002	0.87	0.07	0.00
R ²	0.46	0.73	0.53	0.75	0.01	0.51	0.97

These results confirm our earlier findings: the degree of consistency of preferences and actual results greatly affects the average satisfaction for the couple. This effect is now also present in the global result and in the estimate of treatment S (where the fit is extremely high), but not for treatment G (where every couple has the same consistency, as noted above). Still, we must observe that in this case COHER does not equal 0, while in the previous case we have more observations of each value of this variable.

What we discussed so far is the reason why there is a higher variance in the average satisfaction of the two treatments (as pointed out in [table 6](#)). In treatment G, all have rather high satisfaction, in treatment S there is a more spread distribution.

Comments

Some of our results seem paradoxical at a first sight. The satisfaction of players in group S seems to be the most influenced by the coherence of preferences and results. However, this group is the least able to obtain the preferred solution.

There are many ways to make sense of these results. One possible explanation is that preferences are more relevant for players in treatment G; so for players in treatment S the preferences are a less relevant hint of the possible solution reached: stating their preferences without a previous discussion, they pay less attention to the consistency between preferences and choice. The result of the estimation denies this hypothesis: when the agreement is coherent with

the favourite choice (AGR=PREF2), satisfaction is significantly higher. Another possible explanation is due to the socialisation effect that could be generated by a previous session of “cheap talk”: in that case, it could be more satisfying for a player to obtain lower results because he knows who then get the benefits of this. From interviews carried out after the experiment, we can derive another explanation. Many players who obtained one point declared they were satisfied because they could at least manage to avoid the solution providing 0.5 points. From a common discussion they realized how the fair solution was irrational. A last possible explanation refers to the difference between preferences and expectations. The players in group S have preferences generated individually. They have no clue about others’ preferences and might be less confident about the acceptability of their favourite outcome. Therefore they are less prone to fight for them during the bargaining process. As said, lack of consistency between preferred and actual solutions in treatment S is not explained by the little importance of preferences (as we tentatively hypothesised above). Therefore, the explanation should be found in the subjects’ individual skills and attitude shown during the bargaining procedure.

In the case of G, the test for the impact of achieving the preferred solution is blurred because 10 players out of 14 attain it. The comparison between 10 instances of one kind and 4 instances of the other shows that the variable is not significant. While this result contradicts our earlier conclusion, it is probably due to measurement difficulties. Indeed, when we put these observations together with those of the treatment S, the variable R_{pref2} is significant. Another explanation (not necessarily in conflict with the present) emerges from the recalled survey administered to our subjects after the experiment. Subjects in treatment G generally value alternative b (remind: 1,5 points to the low-grader and 1 point to the high-grader) more than alternatives. Clearly, they observe, it is superior to a (remind: 0,5 points to each player). This is one of the points raised in during the common discussion and it might bear some consequences both on bargaining behaviour and in the satisfaction derived from choosing b (reducing the perceived distance between b and c).

Those who didn’t achieve the group-agreed solution when it was favourable to them may report lower satisfaction, regardless of their individual preferences. Those who obtained their preferred outcome, different from the one voted by the group, on the other hand may consider themselves very lucky (having obtained an unexpected benefit) and thus be more satisfied. At the present moment, these are working hypotheses, which need be confirmed by specific studies.

From all these remarks, it is not surprising that we observe significant differences in the duration of bargaining, that is in the number of offers and counter-offers required to obtain a solution. If a given solution (e.g. c) were a focal point, it should arguably be reached with the lowest possible number of exchanges (each player knows that the solution is c, so he accepts it without long discussions, even if he does not like this solution). On the other hand, if a player is coupled to an opponent with different opinions, and who is trying to further his own interests, the former will bargain hard in order to obtain such a solution.

In the present experiment we have shown that the voting procedure does not determine a focal point, hence the bargain is moved by personal preferences. We should expect less exchanges when individuals – yet unknowingly – share the same opinions. From this perspective we do not observe significant differences, but the problem could rest with the very few observations (3 in G and 2 in S). Moreover, other factors could influence the length of negotiations. Also individual characteristics matter: some subjects appear more eager to fight than others.

Concluding remarks

The first aim of this contribution was to study the role of cheap talk in the determination of a focal point in a bargaining game. On this issue, our conclusions are negative. This is not entirely unexpected; since the common discussion and the voting procedure staged the confrontation of different viewpoints, there has been no unanimous result.

On the other hand, we can conclude that knowing individual preferences may help predicting towards which solutions players will converge, at least in a social setting, and

understanding their satisfaction. These considerations refer to variables traditionally left out of economic analysis, which focuses instead on the final payoff and not on its relation to preferences or satisfaction, which are deemed non-measurable. On the contrary, this work has shown that consistent data emerge by simply asking players to express preferences and satisfaction. This makes us confident in formulating new hypotheses aiming at uncovering and understanding individual behaviour. Even if our results do not allow drawing strong final conclusions, they point out new possible answers, new ideas and topics for discussion. This we regard as a fruitful result.

Detailed instructions

Participants (28 students of the first year of the Faculty of Law, attending a Seminar in the course in Economics) was divided into two treatments in two different rooms. Each of them received the following instructions:

Imagine this situation: you and one of your colleagues have to decide how to divide some additional grade to be added to your final exam note.

There are three possible solutions:

solution a: each of you receive 0.5 point

solution b: player A receive 1 point and player B wins 1.5 point

solution c: player A wins 1.5 point and player A wins 1 point

if you don't reach an agreement no one obtains any additional points.

Player A has got a lower grade than B, in the first part of the exam.

Which solution should they choose, according to you?

Instructions then differ according to the treatment.

group G	group S
<p><i>- You have 5 minutes to make a choice. Write also an explanation for your choice.</i></p> <p>At this point, players received this additional instruction and are allowed to discuss together:</p> <p><i>- Now you have to discuss the same problem in group. Everybody has to explain his point of view.</i></p> <p><i>It is preferable if you reach a common solution, but, if it is necessary, the group can make a choice by majority of votes.</i></p> <p><i>You have 20 minutes.</i></p>	<p><i>- You have 5 minutes to make a choice. Write also an explanation for your choice.</i></p>

Players do not know how the game will go on.

Their exam was divided in two parts, and the first was had been realized at the moment of the experiment.

At this point, half of the player of each group were accompanied into another room.

At this point they were required: *in a situation like the one proposed, do you think you would be player A or player B?*

New instructions are then distributed. Half of the players receive the instruction A and the other the instruction B.

A	B
<p><i>Now you are paired with another player. The pairing will remain unknown to both of you. You have to bargain a common choice for the situation described in the first step.</i></p> <p>Your partner will now propose you a solution: a, b or c. You can accept or reject it. If you reject it, you have then to make a new proposal.</p> <p>Your partner can accept or reject it.</p> <p>The game goes on until you find an agreement, you can play at maximum one hour then if you do not reach a solution no one will get any additional points.</p> <p>You will make your proposal and receive your partner's one on a sheet</p> <p>You have to make your choices in 3 minutes.</p>	<p><i>Now you are paired with another player. The pairing will remain unknown to both of you. You have to bargain a common choice for the situation described in the first step</i></p> <p>Now you have to propose a solution: a, b or c. Your partner can accept it or reject it and make a new proposal. You can accept or reject it.</p> <p>The game goes on until you find an agreement, you can play at maximum one hour then if you do not reach a solution no one will get any additional points.</p> <p>You will make your proposal and receive your partner's answer on a sheet</p> <p>You have to make your choices in 3 minutes.</p>

The experiment was realized in the November 2004 at the University of Piemonte Orientale. It lasted about one hour.

References

- Arrow K.J. (1986), "Rationality of Self and Others in an Economic System", in R. Hogarth e M. Reder (Eds.) *Rational Choice. The Contrast between Economics and Psychology*, Chicago, University of Chicago Press, 201-16
- Binmore K. (1994), *Game Theory and The Social Contract*, Cambridge, MIT Press
- Blaug M. (1980), *The Methodology of Economics*, Cambridge, Cambridge University Press
- Camer C., Loewenstein G. (2004), "Behavioral Economics: Past, Present and Future" in Camer C., Loewenstein G. e Rabin M., (a cura di), *Advances in Behavioral Economics*, Princeton, Russell Sage Foundation
- Chamberlin, E.H. (1948), "An Experimental Imperfect Market", in *Journal of Political Economy*, 56:95-108
- Cohen M.D. e P. Backdayan, (1991), *Organizational Routines are Stored as Procedural Memory: Evidence from a laboratory Study*, University of Michigan, mimeo
- Egidi M. e A. Narduzzo (1997), "The Emergence of Path-dependent Behaviours in Cooperative Contexts", in *International Journal of Industrial organization*, XV,6:677-709
- Egidi M. e Rizzello S. (2004), *Cognitive Economics*, 2 voll., Aldershot, Edward Elgar
- Farrell, J. and Rabin, M. (1996), Cheap Talk. *Journal of Economic Perspectives*, 10 (3): 103-18
- Frank, R.H., Gilovich, T. and Regan, D.T. (1993), Does Studying Economics Inhibit Cooperation?. *Journal of Economic Perspectives*, 7 (2): 159-71
- Hey J.D., (1991), *Experiments in Economics*, Oxford, Blackwell
- Kahneman D. e Tversky A. (1992), "Advances in Prospect Theory Cumulative Representation of Uncertainty", in *Journal of Risk and Uncertainty*, V:297-323
- Kagel J. e A.E. Roth, (1995), *Handbook of Experimental Economics*, Princeton, Princeton University Press
- McCloskey, D.N. (1996), Missing Ethics in Economics. In Klammer, A. (ed.) *The Value of Culture: On the Relationships between Economics and Arts*, Amsterdam University Press, Amsterdam
- Motterilini M. e F. Guala, (a cura di) (2005), *Economia Cognitiva e Sperimentale*, Milano, Università Bocconi Editore
- Novarese M. (2004), "Towards a Cognitive Experimental Economics", in S. Rizzello (ed.), *Cognitive Paradigms in Economics*, London Routledge
- Novarese, M. (2006), Individual learning in different social contexts, *Journal of Socio Economics, forthcoming*
- Novarese M. e S. Rizzello, (2002), "A Cognitive approach to individual learning: Some experimental results, in *Revue d'Economie Politique*
- Novarese M. e S. Rizzello, (1999), "Origin and Recent Development of Experimental Economics" in *Storia del Pensiero Economico*, 37,201-34
- Novarese, M. and Rizzello, S. (2005), Satisfaction and Learning: an experimental game to measure happiness. In F. Parisi & V.L. Smith (eds), *The Law and Economics of Irrational Behavior*, Stanford University Press
- Roth A.E., (1979), *Axiomatic Models of Bargaining*, Lecture Notes In Economics and Mathematical Systems n°170, Springer Verlag
- Roth A.E., (1993), "On the Early History of Experimental Economics", in *Journal of the History of Economic Thought*, 15:184-209
- Roth A.E. e Malouf M.W.K., (1979), "Game-theoretic Models and the Role of Information in bargaining", in *Psychological Review*, 574-94
- Roth A.E., Malouf M.W.K. e Murnighan K.J., (1981), "Sociological versus Strategic Factors in Bargaining", in *Journal of Economic Behavior and Organization*, 2,153-77
- Roth A.E. e Rothblum U.G., (1982), "Risk Aversion and Nash's Solution for

- Bargaining Games with Risky Outcomes", in *Econometrica*, 50:639-47
- Sally, D. (2002), Two Economic Applications of Sympathy. *Journal of Law, Economics & Organization*, 18 (2)
- Samuelson P., Nordhaus W.D. (1985), *Principles of Economics*, XII ed., New York: McGraw-Hill
- Schelling T.C., (1958), "The Strategy of conflict: Prospectus for a Reorientation of Game Theory", in *The Journal of Conflict Resolution*, 2,3, Settembre, pp.203-64
- Schelling T.C., (1959), "For The Abandonment of Symmetry in Game Theory", in *The Review of Economics and Statistics*, 41,3, Agosto, pp.213-24
- Schelling T.C., (1960), *The Strategy of Conflict*, Cambridge, Harvard University Press
- Schumpeter J.A., (1954) *History of Economic Analysis*, trad. it *Storia dell'Analisi Economica*, (1968) Torino, Boringhieri
- Siegel, S. and Fouraker, L.E. (1962), *Bargaining behavior*, Mc Graw-Hill, New York
- Siegel, S. and Fouraker, L.E. (1960), *Bargaining and Group Decision Making: Experiments in Bilateral Monopoly*, Mc Graw-Hill, New York
- Smith V.L., (1962), "An Experimental Study of Competitive Market Behavior", in *Journal of Political Economy*, 70:111-137
- Smith V.L., (1976), " Experimental Economics: Induced Value Theory" in *American Economic Review*, 66:274-77
- Smith V.L., (1982), "Microeconomic Systems as an Experimental Science " in *American Economic Review*, 72:923-55
- Smith V.L.,(a cura di) (1989), *Experimental Economics*, Aldershot, Edward Elgar
- Wilde L.L. (1980) "On the Use of Laboratory Experiments in Economics", in J.C. Pitt (a cura di) (1981) *Philosophy in Economics*, Dordrecht, Riedel